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Department of Parasitology, Warsaw University
Head: Prof. Dr. Wincenty L. Wiśniewski

Teresa SULGOSTOWSKA

Intestinal trematodes of birds of mesotrophic lakes: Gołdapiwo and Mamry Północne

Przywry jelitowe ptaków jezior mezotroficznych: Gołdapiwo i Mamry Północne

The material in this work was collected in 1954 and 1955 on the lake Gołdapiwo (district Giżycko) and in 1956 and 1957 on the lake Mamry Północne (district Węgorzewo) in the course of the collective works conducted by the Department of Parasitology, Warsaw University, headed by the late Professor doctor W. L. Wiśniewski.

The aim of the work was to determine the qualitative and quantitative composition of the fauna of the intestinal trematodes of birds (with the exception of *Strigeidae* elaborated by K. Niewiadomska) living in the biocenosis of the above listed mesotrophic lakes. The analysis of the collected material enabled me also to draw several general biological conclusions.

Methods

The birds were examined according to the methods used on the lake Drużno and described by Wiśniewski (1958). The alimentary tract (small intestine, large intestine and caeca) of the birds was examined by using the decantation method. The trematodes present in the material were segregated into the separate species and counted. A part of the trematodes was directly examined in a drop of water under the microscope, but the considerably larger part was fixed in 75% ethanol. The preparations were stained with alumcarmine and with Blachin's lactic acid carmine (with the exception of *Echinostomatidae* in which the thorns fell out after using the latter stain). As clarifiers were used creosote and oil of cloves.

Table I

Number of found trematodes and invasion of separate species of birds with representatives of trematode families

No.	Bird species	Lake Gołdapiwo		Lake Mamry Północne		Total			No. of found trematode species	*Echinostomatidae*	*Plagiorchiidae*	*Psilostomatidae*	*Notocotylidae*	*Brachylaemidae*	*Heterophyidae*	*Lecithodendriidae*
		exam.	invad.	exam.	invad.	exam.	invad.	%								
	Anatidae															
1.	*Anas crecca* L.	1	1	1	1	2	2		2	+			+			
2.	*Anas platyrhynchos* L.	37	37	7	6	44	43	98	8	+	+	+	+			
3.	*Anas strepera* L.	—	—	4	4	4	4		6	+	+	+	+			
4.	*Anas querquedula* L.	10	9	4	4	14	13	93	4	+	+	+	+			
5.	*Aythya ferina* (L.)	5	5	13	13	18	18	100	5	+	+	+	+			
6.	*Aythya fuligula* (L.)	6	6	1	1	7	7	100	4	+	+	+	+			
7.	*Aythya marila* (L.)	5	5	—	—	5	5	100	4	+	+	+	+			
8.	*Aythya nyroca* (Guld.)	8	7	2	2	10	9	90	4	+	+		+			
9.	*Anser anser* (L.)	2	0	—	—	2	0									
10.	*Bucephala clangula* (L.)	—	—	1	0	1	0									
11.	*Mergus merganser* (L.)	—	—	1	(1)	1	(1)									
	Total	74	70	34	32	108	102	95								
	Phalacrocoracidae															
12.	*Phalacrocorax carbo* (L.)	1	1	6	6	7	7	100	2	+						

	Accipitridae																
13.	*Accipiter gentilis* (L.)	1	(1)	—	—	1	(1)										
14.	*Buteo buteo* (L.)	—	—	1	(1)	1	(1)										
15.	*Circus aeruginosus* (L.)	3	(3)	6	(6)	9	(9)	(100)									
	Total	4	(4)	7	(7)	11	(11)	(100)									
	Ciconiidae																
16.	*Ciconia ciconia* (L.)	—	—	2	2	2	2		1	+							
	Podicipedidae																
17.	*Podiceps cristatus* (L.)	52	48	75	69	127	117	92	5	+							
18.	*Podiceps griseigena* (Bodd.)	5	5	4	4	9	9	100	2	+							
	Total	57	53	79	73	136	126	93									
	Ardeidae																
19.	*Ardea cinerea* L.	16	14	1	1	17	15	88	2	+							
20.	*Botaurus stellaris* (L.)	—	—	4	4	4	4		1	+							
	Total	16	14	5	5	21	19	90									
	Rallidae																
21.	*Fulica atra* (L.)	84	59	102	69	186	128	69	8	+	+	+	+	+		+	
22.	*Gallinula chloropus* (L.)	2	0	—	—	2	0										
23.	*Rallus aquaticus* L.	—	—	1	1	1	1		2					+			
	Total	86	59	103	70	189	129	68									

Tab. I (cont.)

No.	Bird species	Lake Gołdapiwo		Lake Mamry Północne		Total			No. of found trematode species	*Echinostomatidae*	*Plagiorchiidae*	*Psilostomatidae*	*Notocotylidae*	*Brachylaemidae*	*Heterophyidae*	*Lecithodendriidae*
		exam.	invad.	exam.	invad.	exam.	invad.	%								
	Laridae															
24.	*Chlidonias nigra* (L.)	—	—	13	7	13	7	54	2		+					
25.	*Larus canus* L.	—	—	11	5	11	5	45	2	+	+					
26.	*Larus fuscus* L.	—	—	1	(1)	1	(1)									
27.	*Larus ridibundus* L.	12	10	46	41	58	51	88	5	+	+				+	
28.	*Sterna hirundo* L.	8	0	13	2	21	2	9	1		+					
29.	*Stercorarius parasiticus* (L.)	—	—	1	(1)	1	(1)									
	Total	20	10	85	57	105	67	64								
	Charadriidae															
30.	*Actitis hypoleucos* (L.)	—	—	1	1	1	1		1		+					
31.	*Calidris alpina* (L.)	10	1	—	—	10	1	10	1		+					
32.	*Capella gallinago* (L.)	1	0	1	1	2	1		1							
33.	*Charadrius dubius* Scop.	1	0	—	—	1	0					ń				
34.	*Tringa glareola* L.	3	1	—	—	3	1		1		+					
35.	*Tringa totanus* L.	—	—	1	1	1	1		1		+					
36.	*Tringa ochropus* L.	—	—	2	1	2	1		1		+					
37.	*Philomachus pugnax* (L.)	1	1	3	1	4	2		2		+			+		
38.	*Vanellus vanellus* (L.)	4	0	5	0	9	0									
	Total	20	3	13	5	33	8	24								

	Alcedinidae															
39.	*Alcedo atthis* L.	1	0	—	—	1	0									
	Passeriformes															
40.	*Acrocephalus arundinaceus* (L.)	1	0	—	—	1	0									
41.	*Acrocephalus palustris* (Bechst.)	—	—	1	0	1	0									
42.	*Acrocephalus scirpaceus* (Herm)	1	1	—	—	1	1		1						+	
43.	*Emberiza schoeniclus* L.	—	—	1	0	1	0									
44.	*Hirundo rustica.* L.	—	—	1	1	1	1		1		+					
45.	*Lanius collurio* L.	1	0	6	1	7	1	14	2		+			+	+	
46.	*Motacilla alba* L.	1	0	—	—	1	0									
47.	*Riparia riparia* (L.)	2	0	24	0	26	0									
	Total	6	1	33	2	39	3	8								
	Together	285	215	367	259	652	474	73								

Note: In the table the total invasion (including *Strigeidae*, not elaborated in the present work) is given. Data concerning *Strigeidae* are given in parentheses.

Table II

Trematode species found on the lakes Gołdapiwo and Mamry Północne

No.	Trematode species	Gołdapiwo				Mamry Północne			
		No. of host species	No. of host specimens	No. of invaded hosts	No.of found trematodes	No. of host species	No. of host specimens	No. of invaded hosts	No. of found trematodes
	Echinostomatidae Dietz, 1909								
1.	*Echinochasmus amphibolus* Kotlan	—	—	—	—	1	4	1	10
2.	*Echinochasmus boleocephalus* (Linstow)	1	16	3	551	1	1	1	3
3.	*Echinochasmus coaxatus* Dietz	2	57	41	539	2	79	64	1722
4.	*Echinoparyphium aconiatum* Dietz	1	10	1	6	1	4	3	3300
5.	*Echinoparyphium clerci* Skrjabin	—	—	—	—	1	46	1	3
6.	*Echinoparyphium recurvatum* (Linstow)	5	61	29	6342	5	27	10	307
7.	*Echinostoma grandis* (Basch.)	1	84	13	34	1	102	14	36
8.	*Echinostoma revolutum* (Fr.)	3	48	14	387	4	26	13	79
9.	*Episthium bursicola* (Creplin)	1	16	3	24	1	1	1	20
10.	*Episthium mathevossianae* Schach.	1	52	3	16	1	75	5	24
11.	*Haunocephalus ferox* (Rud.)	—	—	—	—	1	2	1	7
12.	*Hypoderaeum conoideum* (Bloch)	1	37	19	473	1	4	1	20
13.	*Hypoderaeun skrjabini* Osch.	—	—	—	—	1	13	5	58
14.	*Mesorchis pseudoechinatus* (Olssen)	2	64	3	9	3	132	6	24
15.	*Moliniella anceps* (Molin)	1	84	11	806	2	109	19	959
16.	*Monilifer spinulosus* (Rud.)	2	57	47	6924	2	79	67	12868
17.	*Paryphostomum radiatum* (Duj.)	1	1	1	50	1	6	6	991
18.	*Petasiger exaeretus* Dietz	—	—	—	—	1	6	6	11500
19.	*Petasiger neocomense*Fuhrm.	—	—	—	—	1	75	1	8

	Plagiorchiidae Lühe, 1901								
20.	*Plagiorchis laricola* Skrjabin	1	12	3	69	4	83	28	1699
21.	*Plagiorchis maculosus* (Rud.)	—	—	—	—	1	1	1	7
22.	*Plagiorchis nanus* (Rud.)	3	14	3	340	2	3	2	45
23.	*Prosthogonimus cuneatus* (Rud.)	1	37	1	2	1	7	1	1
24.	*Prosthogonimus ovatus* (Rud.)	2	96	14	105	3	161	23	320
25.	*Schistogonimus rarus* (Braun)	4	60	21	235	3	24	8	58
	Psilostomatidae Odhner, 1913								
26.	*Apopharynx bolodes* (Braun)	1	84	2	8	1	102	5	20
27.	*Psilochasmus oxyurus* (Crep.)	3	48	28	1153	1	7	4	124
28.	*Psilotrema simillimum* (Mühl.)	1	10	1	2160	1	4	1	15
29.	*Psilostomum spiculigerum* Mühl.	—	—	—	—	1	102	2	15
	Notocotylidae Lühe, 1909								
30.	*Catatropis pacifera* Noble	1	84	26	301	1	102	24	211
31.	*Catatropis verrucosa* (Fr.)	—	—	—	—	1	13	3	34
32.	*Notocotylus attenuatus* (Rud.)	5	66	24	830	3	12	7	511
	Brachylemidae Stiles et Hassal, 1898								
33.	*Leucochloridium cyanocittae* Mc Int.	1	84	1	23	2	9	2	6
34.	*Neoleucochloridium holostomum* (Rud.)	—	—	—	—	1	1	1	35
	Heterophyidae Odhner, 1914								
35.	*Apophallus mühlingi* (Jägersk.)	1	12	1	62	1	46	12	6047
	Lecithodendriidae Odhner, 1911								
36.	*Laterotrema arenula* (Crep.)	—	—	—	—	1	102	4	9830

Material

The material was collected in 1954—1957 (May, July, August, September, November). A total number of 652 birds belonging to 47 species (11 families) were examined, of which 474 (72.7%) were invaded. Tabular arrangement of the examined birds, percentage of their invasion and families and number of species of the trematodes found in the separate species of birds are shown in Table I. From the data it can be concluded that the extensity of the invasion of the birds on the lakes Gołdapiwo and Mamry Północne is more or less uniform. Families of birds given in Table I can be subdivided in 3 groups:

1. *Anatidae* (No 1—11) -- large extensity of invasion and diversity of species of trematodes.
2. *Phalacrocoracidae, Accipitridae, Ciconiidae, Podicipedidae, Ardeidae, Rallidae, Laridae* (No. 12—29) — also large extensity but markedly lower diversity of species of trematodes with the exception of *Fulica atra* (L.).
3. *Charadriidae, Alcedinidae, Passeriformes* (No. 30—47) — small extensity and not large number of trematodes.

The above facts are undoubtedly to a large extent caused by the quality of food taken by the birds. Table I stresses the differentiation of the families of trematodes in the different families of birds. It shows that species of birds belonging to the same family have a very similar parasitic fauna.

On the lake Gołdapiwo and Mamry Północne I found a total number of 36 species of intestinal trematodes, which belong to 7 families. In Table II is shown the tabular arrangement of those species and their hosts on the lakes, the number of the examined and invaded hosts and the number of the individuals of the separate species of trematodes collected. It shows that on the lake Gołdapiwo less species (25) of trematodes were found than on the lake Mamry Północne (36 species). This is caused above all by the quantitatively and qualitatively poorer fauna of birds. Thus I did not found *Echinochasmus amphibolus, Chaunocephalus ferox, Petasiger exaeretus, Plagiorchis maculosus, Neoleucochloridium holostomum* (species of a narrow specificity) most probably because of the lack of suitable for them species of hosts on the lake Gołdapiwo, and *Echinopharyphium clerci, Petasiger neocemense, Psilostomum spiculigerum* (species very rare, found in Poland for the firts time) because of the absence of a sufficient number of hosts. Therefore only in the case of *Hypoderaeum skrjabini, Catatropis verrucosa* and *Laterotrema arenula* it is possible to say, that they are specific to the lake Mamry. This shows, therefore, that the occurrence of a parasite is conditioned above all by the presence of a proper host.

Descriptions

Fam. *Echinostomatidae* Dietz, 1909

This family (and the family *Strigeidae*) is most numerously represented on the lakes Gołdapiwo and Mamry Północne. In 17 species of birds (36.2% of all the examined species) there were found 19 species of trematodes belonging to 11 genera. Common hosts of *Echinostomatidae* on the examined terrain proved to be ducks (there were 8 invaded in 11 species examined), besides them also grebes, gulls, coots, herons and cormorants. The greatest number of species was found in *Podiceps cristatus* (L.): 5 species, i.e. 62% of all the species found in the intestine of this bird, and in *Anas platyrhynchos* L.: 4 species, i.e. 33.3%.

The majority of the species is connected with only one, at the most — with two hosts. Only few, e.g., *Echinoparyphium recurvatum* (7 host species) and *Echinostoma revolutum* (5 host species) show broad specificity.

The greatest intensity of occurrence (Table III) was recorded for *Monilifer spinulosus* (19792 specimens), *Petasiger exaeretus* (11500 specimens) and *Echinoparyphium recurvatum* (6649 specimens).

1. *Echinochasmus amphibolus* Kotlan, 1922

Geographical distribution: Hungary, USSR, Switzerland.

Hosts: *Botaurus stellaris* L., *Nycticorax nycticorax* L., *Phalacrocorax carbo* L.

Habitat: small intestine.

In Poland recorded for the first time* on the lake Mamry Północne.

Extensity of invasion: from among 4 *Botaurus stellaris* one invaded with 10 specimens.

2. *Echinochasmus beleocephalus* (Linstow, 1873)

Geographical distribution: Germany, USSR. In Polad found by Bezubik (1956 a).

Hosts: *Ardea cinerea* L., *Ardeola ralloides* (Scop.), *Nycticorax nycticorax* L., *Anas platyrhynchos* L.

Habitat: small intestine.

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* In this as in other cases the data available in the literature did not allow to make a detailed list of parasites found in former Prussia, therefore I am not reporting the historical occurrence for Mazury but generally for Poland in the political and not geographical sense.

Table III

Occurrence of *Echinostomatidae* in bird species

Trematode species	*Anas crecca*	*Anas platyrhynchos*	*Anas strepera*	*Anas querquedula*	*Aythya ferina*	*Aythya fuligula*	*Aythya marila*	*Aythya nyroca*	*Podiceps cristatus*	*Podiceps griseigena*	*Larus canus*	*Larus ridibundus*	*Ardea cinerea*	*Botaurus stellaris*	*Ciconia ciconia*	*Phalacrocorax carbo*	*Fulica atra*
Echinochasmus amphibolus														×			
E. beleocephalus													×				
E. coaxatus									×	×							
Echinoparyphium aconiatum				×													
E. clerci												×					
E. recurvatum	×	×	×		×	×	×	×									
Echinostoma grandis																	×
E. revolutum		×	×		×	×		×									
Episthmium bursicola													×				
E. mathevossianae									×								
Chaunocephalus ferox															×		
Hypoderaeum conoideum		×	×														
Hypoderaeum skrjabini					×												
Mesorchis pseudoechinatus									×		×	×					
Moliniella anceps		×															×
Monilifer spinulosus									×	×							
Paryphostomum radiatum																×	
Petasiger exaeretus																×	
Petasiger neocomense									×								

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne found in 23.5% of *Ardea cinerea* (in 17 examined 4 invaded).

Intensity of invasion: 3—450 individuals.

3. *Echinochasmus coaxatus* Dietz, 1909

Geographical distribution: Germany, Western Europe, USSR. In Poland found by Sulgostowska (1958).

Hosts: *Podiceps cristatus* L., *Podiceps griseigena* (Bodd.), *Anas platyrhynchos* L., *Ciconia ciconia* L.

Habitat: Large and small intestines.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne found in 78.7% *Podiceps cristatus* (in 127 examined 100 invaded) and in 55.5% *Podiceps griseigena* (in 9 examined 5 invaded).

Intensity of invasion: in *Podiceps cristatus* 1—120, in *Podiceps griseigena* 2—70 specimens.

Note: On the examined terrain the parasite belongs to the group of common species, occurs very often but not numerously. Typical intestinal parasite of the *Podiceps* in Mazury.

4. *Echinoparyphium aconiatum* Dietz, 1909

Geographical distribution: Germany, USSR, Western Europe. In Poland found by Bezubik (1956 a).

Hosts: *Anas crecca* L., *Anas querquedula* L., *Spatula clypeata* L., *Vanellus vanellus* L.

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 28.6% of *Anas querquedula* (in 14 examined 4 invaded).

Intensity of invasion: 6—260, one bird invaded by 3000 specimens.

Note: In the case of this enormous invasion all the individuals were immature. It seems possible that the duck was caught immediately following the invasion with the trematodes.

5. *Echinoparyphium clerci* Skrjabin, 1915

Geographical distribution: USSR.

Hosts: *Vanellus vanellus* (L.), *Tringa glareola* L., *T. nebularia* (Gunn.), *Larus cachinnans* Pall., *L. ichtyaetus*, (Pall.) *L. ridibundus* L., *Chlidonias leucoptera* (Temm.), *Chl. nigra* (L.), *Sterna hirundo* L., *Anas querquedula* L., *A. platyrhynchos* L., *A. acuta* L., *Aythya ferina* (L.), *Oxyura leucocephala* (Scop.).

Habitat: intestine.

In Poland recorded for the first time.

Extensity of invasion: on the lake Mamry Północne I found it in 2.2% of *Larus ridibundus* (in 46 examined 1 invaded); one specimen was found.

Note: On Mazury a very rare species.

6. *Echinoparyphium recurvatum* (Linstow, 1873)

Geographical distribution: England, Germany, Japan, Africa, USSR.

Found in Poland by Kowalewski (1902), Bezubik (1956 b) and Sulgostowska (1958).

Hosts: *Gallus gallus dom.* L., *Anas platyrhynchos dom.* L., *A. platyrhynchos* L., *A. acuta* L., *A. crecca* L., *Aythya marila* L., *A. fuligula* L., *Oidemia nigra* L., *Rallus aquaticus* L., *Tringa nebularia* (Gunn.), *Larus canus* L., *L. ridibundus* L., *Strix uralensis nikolskii* But., *Botaurus stellaris* L., *Columba livia* Bon.

Habitat: small and large intestines.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 80% of *Aythya marila* (in 5 examined 4 invaded); in 71.4% of *A. fuligula* (in 7 examined 5 invaded); in 60% of *A. nyroca* (in 10 examined 6 invaded); in 44.4% of *A. ferina* (in 18 examined 8 invaded); in 32% of *Anas platyrhynchos* (in 44 examined 14 invaded); in 2 *A. crecca* examined one was invaded; and in 4 examined *A. strepera* one invaded.

Intensity of invasion: in *A. marila* 7—3000, in *A. fuligula* 6—160, in *A. nyroca* 3—750, in *A. ferina* 3—300, in *A. platyrhynchos* 3—50, in *A. crecca* 20, and in *A. strepera* 20 individuals.

7. *Echinostoma grandis* Baschkirova, 1946

Geographical distribution: USSR.

Host: *Fulica atra* L.

Habitat: small intestine, in my material also in the caeca.

In Poland reported for the first time.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 14.5% (in 186 examined 27 invaded) of *Fulica atra*.

Intensity of invasion: 1—7 individuals.

Note: on Mazury it belongs to rare parasites.

8. *Echinostoma revolutum* (Fröhlich 1802) Dietz, 1909

Geographical distribution: cosmopolitan. In Poland found by Kowalewski (1895), Ruszkowski (1925), Markowski (1933), Bezubik (1956 b), and Sulgostowska (1958).

Hosts: ducks, geese, hens, crows, cat, mouse, swine, rabbit, and sometimes even the man.

Habitat: intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 34.1% of *Anas platyrhynchos* (in 44 examined 15 invaded), in 33.3% of *Aythya ferina* (in 18 examined 6 invaded), in 14.3% of *Aythya fuligula* (in 7 examined 1 invaded), in 10% of *Aythya nyroca* (in 10 examined 1 invaded), in 4 examined *Anas strepera* all invaded.

Intensity of invasion: in *A. platyrhynchos* 1—45, in *A. ferina* 1—10, in *A. fuligula* 1, in *A. nyroca* 10, in *A. strepera* 2—37 specimens.

Note: *E. revolutum* belongs to trematodes of very great possibilities of adaptation to a host (on the lakes Gołdapiwo and Mamry Północne it has after *Echinoparyphium recurvatum* the largest number of hosts) and in spite of this it occurs on the examined terrain not too often and not numerously.

9. *Episthmium bursicola* (Creplin, 1837)

Geographical distribution: Germany, Egypt, USSR. In Poland recorded for the first time by Bezubik (1956 a).

Hosts: *Ardea cinerea* L., *A. purpurea* L., *Ardeola ralloides* (Scop.), *Botaurus stellaris* L., *Circaëtus gallicus* (Gm.), *C. cyaneus* L.

Habitat: bursa Fabricii.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 23.5% of *Ardea cinerea* (in 17 examined 4 invaded).

Intensity of invasion: 5—20 individuals.

10. *Episthmium mathevossianae* Schachtachtinskaja, 1952

Syn.: *Episthmium colymbi* Schigin, 1956

Geographical distribution: USSR.

Hosts: *Podiceps cristatus* L., *Aythya fuligula* L., *Netta rufina* Pall.

Habitat: large intestine.

In Poland found for the first time.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 6.3% of *Podiceps cristatus* (in 127 examined 8 invaded).

Intensity of invasion: 2—10 individuals.

Note: Belongs to very rare parasites on Mazury. This species was described for the first time by Schachtachtinskaja (1952). In 1956 Schigin described it again as a new species under the name *Episthmium colymbi*. For the documentation to prove that in fact it is one and the same species I am presenting dimensions (Table IV) and drawings of Schachtachtinskaja, Schigin and my own and I propose to include the name *E. colymbi* to synonyms of *E. mathevossianae*.

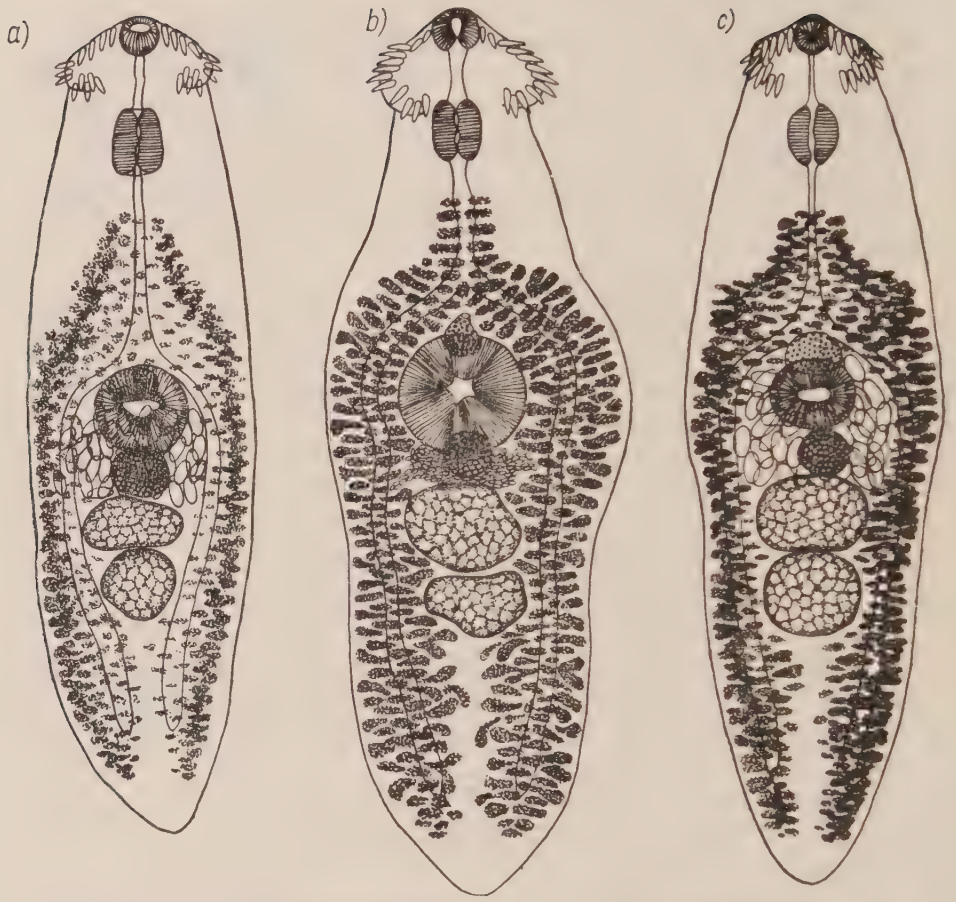

Fig. 1. *Episthmium mathevossianae* Schachtachtinskaja, 1952, a — after Schachtachtinskaja (1952); b — after Schigin; c — orig.

11. *Chaunocephalus ferox* (Rud., 1795) Dietz, 1909

Geographical distribution: Germany, Austria, USSR. In Poland recorded by Kowalewski (1895) and Ruszkowski (1925).

Hosts: *Ciconia nigra* L., *C. ciconia* L., *Botaurus stellaris* L.

Habitat: small intestine.

Extensity of invasion: in one of the 2 examined *C. ciconia* on the lake Mamry Północne I found 7 individuals.

Table IV

Measurements of *Episthmium mathevossianae* after various authors (in mm)

No	Measurements	Schachtachtinskaja	Schigin	Sulgostowska
1.	Length of body	1.65—1.85	2.37	1.8 —2.4
2.	Width of body	0,56 —0.58	0.72	0.50—0.79
3.	Head spines (length)	0.039—0.040	0.058—0.066	0.042—0.052
4.	Head spines (width)	—	0.016—0.022	0.016—0.020
5.	Cuticular spines	0.32	0.025—0.037	0.030
6.	Oral sucker	0.081—0.085	0.063—0.142	0.070—0.120
7.	Ventral sucker	0.22	0.179—0.258	0.16 —0.22
8.	Praepharynx	0.064	0.096—0.158	0.06 —0.13
9.	Pharynx (length)	0.165	0.117—0.163	0.14 —0.18
10.	Pharynx (width)	0.065	0.117—0.150	0.14 —0.17
11.	Testis I (length)	0.116	0.188—0.233	0.16 —0.22
12.	Testis I (width)	0.20	0.204—0.296	0.20 —0.29
13.	Testis II (length)	0.14 —0.17	0.167—0.188	0.14 —0.22
14.	Testis II (width)	—	0.199—0.254	0.16 —0.23
15.	Ovary	0.17 —0.18	0.117—0.179	0.12 —0.16
16.	Eggs (length)	0.052—0.060	0.089—0.097	0.088—0.098
17.	Eggs (width)	0.031—0.037	0.055—0.058	0.040—0.052

12. *Hypoderaeum conoideum* (Bloch, 1782) Dietz, 1909

Geographical distribution: Western Europe, Bulgaria, Japan, China, Africa, USSR. Recorded in Poland by Kowalewski (1902), Ruszkowski (1925), Bezubik (1956 b) and Sulgostowska (1958).

Hosts: *Anser anser* L., *A. anser dom.* L., *A. albifrons* (Scop.), *Anas acuta* L., *A. platyrhynchos* L., *A. querquedula* L., *A. strepera* L., *Aythya fuligula* L., *Aythya nyroca* (Güld.), *Spatula clypeata* L., *Mergus merganser* L., *Tadorna tadorna* L., *Clangula hyemalis* L., *Bucephala clangula* (L.), *Gallus gallus dom.* L., *Meleagris gallopavo* L.

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 43.2% of *Anas platyrhynchos* (in 44 examined 19 invaded) and in one of 4 examined *A. strepera*.

Intensity of invasion: in *Anas platyrhynchos* 3 — 75, in *A. strepera* 20 individuals.

13. *Hypoderaeum skrjabini* Oschmarin, 1946

Geographical distribution: USSR.
Host: *Aythya ferina* L.
Habitat: small intestine.
In Poland found for the first time.

Extensity of invasion: on the lake Mamry Północne in 38.4% of *Aythya ferina* (in 13 examined 5 invaded).

Intensity of invasion: 1 — 36 individuals.

Note: The trematodes of this species differ from *Hypoderaeum conoideum* by anatomical structure, while the dimensions of the body and the separate organs are very similar. Therefore the fundamental differences are easier to observe on live material than on preparations. A detailed review of the trematodes of the genus *Hypoderaeum* in vivo found in *Aythya ferina* enabled me to classify them to the species *H. skrjabini*. Also the trematodes of the genus *Hypoderaeum* found in the same host on the lake Drużno belong to the above named species, not as wrongly classified in my work (1958) to the species *Hypoderaeum conoideum*.

14. *Mesorchis pseudoechinatus* (Olsson, 1876) Dietz, 1909

Geographical distribution: Sweden, Africa, America, USSR. In Poland recorded by Kowalewski (1895), Markowski (1933) and Sulgostowska (1958).

Hosts: *Larus ridibundus* L., *L. canus* L., *L. marinus* L., *L. minutus* Pall., *L. argentatus cachinnans* Pall., *L. fuscus* L., *L. genei* Brem, *Sterna hirundo* L., *Aythya nyroca* Güld., *Mergus merganser* L.

Habitat: small and large intestines.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 2.4% of *Podiceps cristatus* (in 127 examined 3 invaded), in 8.6% of *Larus ridibundus* (in 58 examined 5 invaded), in 9% of *Larus canus* (in 11 examined 1 invaded).

Intensity of invasion: in *P. cristatus* 3 — 10, in *L. ridibundus* 1 — 3, in *L. canus* 10 individuals.

15. *Moliniella anceps* (Molin, 1859) Hübner, 1939

Geographical distribution: Europe.
Host: *Fulica atra* L.
Habitat: small intestine, in my material mainly in the caeca.
In Poland found for the first time.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 15.6% of *Fulica atra* (in 186 examined 29 invaded) and in 2.3% of *Anas platyrhynchos* (in 44 examined 1 invaded).

Extensity of invasion: in *Fulica atra* 2 — 210, in *A. platyrhynchos* 25 individuals.

Note: This species was recorded as specific to *Fulica atra*, in *Anas platyrhynchos* is recorded for the first time (lake Mamry, 1956).

16. *Monilifer spinulosus* (Rud., 1809)

Geographical distribution: Germany, Western Europe, USSR. In Poland recorded by Ruszkowski (1925), Bezubik (1956 a) and Sulgostowska (1958).

Hosts: *Podiceps cristatus* L., *P. griseigena* (Bodd.), *Colymbus arcticus* L., *C. stellatus* (Pont.), *Aythya marila* L.

Habitat: small and large intestines.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 83% of *Podiceps cristatus* (in 127 examined 106 invaded) and in 88.8% of *Podiceps griseigena* (in 9 examined 8 invaded).

Intensity of invasion: in *P. cristatus* 10 — 800, in *P. griseigena* 20 — 200 individuals.

Note: It is a most common species on the lakes Gołdapiwo and Mamry Północne.

17. *Paryphostomum radiatum* (Dujardin, 1845)

Geographical distribution: France, England, Japan, Australia, USSR. In Poland recorded by Sulgostowska (1958).

Hosts: *Phalacrocorax carbo* L., *Ph. aristotelis* L., *Ph. carbo sinensis* (Shaw.), *Ph. fuscicollis* Steph.

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne 100% of *Phalocrocorax carb* invaded (in 7 examined all invaded).

Intensity of invasion: 5 — 380 individuals.

18. *Petasiger exaeretus* Dietz, 1909

Geographical distribution: Germany, England, Australia, USSR.

Hosts: *Phalacrocorax carbo* L., *Ph. pygmaeus* Pall.

Habitat: small intestine.

In Poland recorded for the first time.

Extensity of invasion: on the lake Mamry Północne in 100% of *Phalacrocorax carbo* (in 6 examined 6 invaded).

Intensity of invasion: 100 — 8500 specimens.

19. *Petasiger (Neopetasiger) neocomense* Fuhrmann, 1927

Geographical distribution: Switzerland, USSR.
Hosts: *Podiceps cristatus* L., *Podiceps griseigena* (Bodd.)
Habitat: small intestine.

In Poland recorded for the first time.

Extensity of invasion: on the lake Mamry Północne in 1.3% of *Podiceps cristatus* (in 75 examined 1 invaded). Totally there were 8 individuals.

Note: On Mazury a very rare and not numerous species.

Fam. *Plagiorchiidae* Lühe, 1901

On the lakes Gołdapiwo and Mamry Północne I found the total number of 6 species of trematodes — 3 of the subfamily *Plagiorchiinae* and 3 of the subfamily *Prosthogoniminae*. There were 17 species of birds invaded by them (36.2% of all the examined), therefore they are as common as *Echinostomatidae* but they do not occur so numerously. The main hosts of *Prosthogoniminae* are ducks, and of *Plagiorchiinae* — plavers. Besides them also gulls, sparrows and coots. To several species of birds (plovers and sparrows) *Plagiorchiidae* are the sole parasitic fauna.

The majority of the found species shows a broad specificity. The greatest intensity of occurrence shows *Plagiorchis laricola* (Table V).

20. *Plagiorchis laricola* Skrjabin, 1924

Geographical distribution: USSR, Ireland. In Poland Sulgostowska (1958).

Hosts: *Larus cachinnans* Pall., *L. taimyrensis* But., *L. canus* L., *L. ichtyaetus* Pall., *Larus minutus* Pall., *L. ridibundus* L., *Chlidonias nigra* (L.), *Sterna hirundo* L., *Meleagris gallopavo* L.

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 40% of *Larus ridibundus* (in 58 examined 23 invaded), in 18.2% of *Larus canus* (in 11 examined 2 invaded), in 4.8% of *Sterna hirundo* (in 21 examined 1 invaded), in 38.4% of *Chlidonias nigra* (in 13 examined 5 invaded).

Intensity of invasion: in *Larus ridibundus* 2 — 300, in *Larus canus* 1 — 10, in *Sterna hirundo* 10, in *Chlidonias nigra* 8 — 380 specimens.

Table V

Occurrence of *Plagiorchiidae* in bird species

Trematode species	*Anas platyrhynchos*	*Anas strepera*	*Anas querquedula*	*Aythya ferina*	*Aythya marila*	*Aythya nyroca*	*Calidris alpina*	*Tringa glareola*	*Tringa totanus*	*Tringa ochropus*	*Philomachus pugnax*	*Chlidonias nigra*	*Larus canus*	*Larus ridibundus*	*Sterna hirundo*	*Fulica atra*	*Hirundo rustica*
Plagiorchis laricola												×	×	×	×		
Plagiorchis maculosus																	×
Plagiorchis nanus							×	×	×	×	×						
Prosthogonimus cuneatus	×																
Prosthogonimus ovatus												×		×		×	
Schistogonimus rarus	×	×	×	×	×	×											

21. *Plagiorchis maculosus* (Rud., 1802)

Geographical distribution: Sweden, Austria, Germany, England, India, Japan, USSR. In Poland Kowalewski (1902) and Sulgostowska (1958).

Hosts: *Branta bernicla* (L.), *Histrionicus histrionicus* (L.), *Larus canus* L., *Accipiter nisus* (L.), *Pica pica* L., *Corvus corone sharpii* Oates, *Sturnus vulgaris* L., *Micropus apus* (L.), *Fringilla coelebs* L., *Passer domesticus* L., *Emberiza cia* L., *E. calandra* L., *Motacilla alba* L., *Sitta europaea* L., *Hirundo rustica* L., *Riparia riparia* (L.), *Delichon urbica* L., *Upupa epops* L., *Caprimulgus caprimulgus* L., *C. europaeus meridionalis* Hart.

Habitat: large intestine.

Extensity of invasion: on the lake Mamry Północne in 1 *Hirundo rustica* L. I found 7 trematodes.

Note: *P. maculosus* belongs to cosmopolitan species, parasitizes mainly in sparrows. In my material observed not numerously, because the sparrows as birds loosely connected with the water environment were not the object of our studies.

22. *Plagiorchis nanus* (Rud., 1802)

Geographical distribution: Europe, USSR. In Poland Sulgostowska (1958).

Hosts: *Glareola melanoptera* Nordm., *Vanellus vanellus* (L.), *Numenius arquata* (L.), *N. termirostris* Vieill., *Limosa limosa* (L.), *Actitis hypoleucos* (L.), *Tringa glareola* L., *T. nebularia* (Gunn.), *T. stagnatilis* (Bechst.), *Philomachus pugnax* (L.) *Calidris minuta* (Leisl.), *Capella gallinago* (L.) *Phalaropus lobatus* (L.).

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in one of the 3 examined *Tringa glareola* there were 110 trematodes, in one examined *T. totanus* there were 15 trematodes, in one of 2 examined *T. ochropus* there were 30 trematodes, in one of 4 examined *Philomachus pugnax* there were 226 trematodes and in one of 10 examined *Calidris alpina* there were 4 trematodes.

23. *Prosthogonimus cuneatus* (Rud., 1803)

Geographical distribution: cosmopolitan species. In Poland Markowski (1933), Ruszkowski (1925), Furmaga (1957).

Hosts: domestic birds, *C. corax* L., *C. cornix* L., *C. corone* L., *C. frugilegus* L., *Garrulus glandarius* (L.),*Fringilla coelebs* L., *Passer domesticus* (L.) *Lanius minor* Gm., *Cygnus cygnus* (L.), *Anser anser* (L.), *Branta bernicla* (L.), *B. ruficollis* (Pall.), *Anas acuta* L., *Aythya marila* (L.), *Bucephala clangula* (L.), *Phasianus colchicus* L., *Grus grus* (L.), *Otis tarda* L., *Phalacrocorax carbo* (L.), *Ardea cinerea* L., *Fulica atra* (L.), *Numenius arquata* (L.), *Circus aeruginosus* (L.) *Accipiter nisus* (L.)

Habitat: bursa Fabricii.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 4.5% of *Anas platyrhynchos* (in 44 examined 2 invaded).

Intensity of invasion: 1 — 2 specimens.

24. *Prosthogonimus ovatus* (Rud., 1803)

Geographical distribution: cosmopolitan species. In Poland found by Kowalewski (1902), Ruszkowski (1925), Markowski (1933), Bezubik (1956 a), Furmaga (1957) and Sulgostowska (1958).

Hosts: domestic birds, *Anatidae, Passeriformes, Micropodidae, Cuculidae, Picidae, Rallidae, Laridae, Galli, Charadriidae, Falconidae, Strigidae, Podiceps griseigena* (Bodd.), *Ardea cinerea* L., *Grus grus* (L.), *Otis tarda* L., *Alcedo atthis* L.

Habitat: bursa Fabricii, in my material by a great number of individuals also in the large intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 18% of *Fulica atra* (in 186 examined 33 invaded), in 5%

of *Larus ridibundus* (in 58 examined 3 invaded) in 8% of *Chlidonias nigra* (in 13 examined 1 invaded).

Intensity of invasion: in *Fulica atra* 2—160, in *Larus ridibundus* 2 — 4, in *Chlidonias nigra* 2 individuals.

25. *Schistogonimus rarus* (Braun, 1901)

Geographical distribution: Europe, USSR.

Hosts: *Anas platyrhynchos* L., *A. querquedula* L., *A. acuta* L., *Aythya ferina* (L.), *A. fuligula* (L.), *Spatula clypeata* (L.), *Anser anser* (L.), *Fulica atra* L.

Habitat: bursa Fabricii.

In Poland recorded for the first time.

Degree of invasion: in 48% of *Anas platyrhynchos* on the lakes Gołdapiwo and Mamry Północne (in 44 examined 21 invaded), in 10% of *Aythya nyroca* (in 10 examined 1 invaded) in 1 of 5 examined *A. marila*, in 7% of *Anas querquedula* (in 14 examined 1 invaded), in 11% of *Aythya ferina* (in 18 examined 2 invaded), and in 3 from 4 examined *Anas strepera*.

Intensity of invasion: in *Anas platyrhynchos* 1 — 65, in *A. nyroca* 29, in *A. marila* 3, in *A. querquedula* 1 — 5, in *A. strepera* 1 — 10, in *A. ferina* 1 — 5 individuals.

Fam. *Psilostomatidae* Odhner, 1913

I found on the lakes Gołdapiwo and Mamry Północne 4 species belonging to 3 genera. There was a total number of 6 species of birds (13% of all the examined) invaded by them. Ducks and coots are their hosts (Table VI).

26. *Apopharynx bolodes* (Braun, 1902)

Geographical distribution: Germany, England, USSR.

Host: *Fulica atra* L.

Habitat: bursa Fabricii.

Recorded in Poland for the first time.

Degree of invasion: on the lakes Gołdapiwo and Mamry Północne in 4% of *Fulica atra* (in 186 examined 7 invaded).

Intensity of invasion: 1 — 7 individuals.

Table VI

Occurrence of *Psilostomatidae* in bird species

Trematode species	*Anas platyrhynchos*	*Anas strepera*	*Anas querquedula*	*Aythya fuligula*	*Aythya marila*	*Fulica atra*
Apopharynx bolodes						×
Psilochasmus oxyurus	×			×	×	
Psilotrema spiculigerum						×
Psilotrema simillimum		×	×			

27. *Psilochasmus oxyurus* (Creplin, 1825)

Geographical distribution: Germany, England, USSR. In Poland Sulgostowska (1958).

Hosts: *Tadorna tadorna* L., *Aythya marila* L., *A. fuligula* L., *A. clangula* L., *A. hyemalis* L., *Anas platyrhynchos dom.* L., *A. platyrhynchos* L., *A. clypeata* L., *A. strepera* L., *A. acuta* L., *A. penelope* L., *Oidemia nigra* L., *Gallus gallus dom.* L.

Habitat: small intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 66% of *Anas platyrhynchos* (in 44 examined 29 invaded), in 20% of *A. marila* (in 5 examined 1 invaded), in 30% of *A. fuligula* (in 7 examined 2 invaded).

Intensity of invasion: in *A. platyrhynchos* 2 — 250, in *A. marila* 40, in *A. fuligula* 19 — 41 individuals.

Note: on Mazury frequently and numerously recorded.

28. *Psilotrema spiculigerum* Mühling, 1898

Geographical distribution: Germany, France, England.

Hosts: *Anser anser dom.* L., *A. anser* L., *Anas platyrhynchos dom.* L., *Aythya nyroca* (Güld.), *Fulica atra* L.

Habitat: small intestine.

Recorded in Poland for the first time.

Extensity of invasion: on the lake Gołdapiwo in 2% of *Fulica atra* (in 102 examined 2 invaded).

Intensity of invasion: 1 — 15 individuals.

29. *Psilotrema simillimum* (Mühling, 1898)

Geographical distribution: Germany, England, USSR.
Hosts: *Aythya nyroca* (Güld.), *Anas strepera* L.
Habitat: small intestine.

In Poland recorded for the first time.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 7% of *Anas querquedula* (in 14 examined 1 invaded), in 4 examined *Anas strepera* 1 invaded.

Intensity of invasion: in *A. querquedula* 2160, in *Anas strepera* 15 individuals.

Note: in case of a mass invasion all the individuals were immature (fresh invasion).

Fam. *Notocotylidae* Lühe, 1909

I found on the lakes Gołdapiwo and Mamry Północne 3 species belonging to 2 genera. There were invaded by them 8 species of birds what makes 17% of all the examined. Ducks and the coot are their hosts (Table VII).

Table VII
Occurrence of *Notocotylidae* in bird species

Trematode species	*Anas crecca*	*Anas platyrhynchos*	*Anas querquedula*	*Aythya ferina*	*Aythya fuligula*	*Aythya marila*	*Anas strepera*	*Fulica atra*
Catatropis pacifera								×
Catatropis verrucosa				×				
Notocotylus attenuatus	×	×	×		×	×	×	

30. *Catatropis pacifera* Noble, 1933

Geographical distribution: Japan, Mexico, USSR. In Poland Bezubik (1956 a), Sulgostowska (1958).
Hosts: *Fulca atra* L., *Fulica americana* Gm., *Porzana porzana* (L.).
Habitat: caeca.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 27% of *Fulica atra* (in 186 examined 50 invaded).

Intensity: 2 — 72 individuals.

31. *Catatropis verrucosa* (Fröhlich, 1789) Odhner, 1905

Geographical distribution: Western Europe, USSR. In Poland Kowalewski (1902).

Hosts: *Anas platyrhynchos dom.* L., *A. strepera* L., *Anser anser dom.* L., *A. anser* L., *A. albifrons* (Scop.), *Anas querquedula* (L.), *A. crecca* (L.), *Aythya ferina* (L.), *A. marila* (L.), *A. fuligula* (L.), *Mergus serrator* L., *M. merganser* L., *Branta leucopsis* (Bechst.), *B. bernicla* (L.), *Cygnus musicus* Bechst., *C. cygnus* (L.), *C. olor* (Gm.), *Somateria mollissima* (L.), *Bucephala clangula* (L.), *Tadorna tadorna* (L.), *Mareca penelope* (L.), *Spatula clypeata* (L.), *Clangula hyemalis* (L.), *Oidemia nigra* L., *O. fusca* (L.).

Habitat: caeca.

Extensity of invasion: on the lake Mamry Północne in 23% of *A. ferina* (L.) (in 13 examined 3 invaded).

32. *Notocotylus attenuatus* (Rud., 1809)

Geographical distribution: Western Europe, USSR, Asia, Japan, Australia. In Poland Ruszkowski (1925), Bezubik (1956 a) and Sulgostowska (1958).

Hosts: *Anas platyrhynchos* L., *A. platyrhynchos dom.* L., *A. penelope* L., *A. acuta* L., *Aythya hyemalis* L., *A. fuligula* L., *A. marila* (L.), *A. ferina* (L.), *A. querquedula* (L.), *A. crecca* (L.), *Anser anser dom.* L., *A. albifrons* (Scop.), *Cygnus cygnus* L., *C. olor* Gm., *Tadorna tadorna* L., *Gallus gallus dom.* L., *Chen caerulescens* L., *Branta bernicla* (L.), *Spatula clypeata* (L.), *Bucephala clangula* (L.), *Somateria molissima* (L.), *Oidemia fusca* (L.), *Mergus merganser* L., *Oxyura leucocephala* (Scop.).

Habitat: caeca.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 50% of *Anas platyrhynchos* (in 44 examined 22 invaded), in 30% of *Aythya nyroca* (in 10 examined 3 invaded), in 20% of *Aythya marila* (in 5 examined 1 invaded), in 7% of *Anas querquedula* (in 14 examined 1 invaded), in 14.3% of *A. fuligula* (in 7 examined 1 invaded), in 4 examined *Anas strepera* 2 invaded, in 2 examined *Anas crecca* 1 invaded.

Intensity of invasion: in *A. platyrhynchos* 14 — 190, in *A. nyroca* 5 — 40, in *A. marila* 1, in *A. querquedula* 18, in *A. fuligula* 20, in *A. strepera* 5 — 170, in *A. crecca* 1 individual.

Fam. *Brachylaemidae* Stiles et Hassal, 1898

This family is represented only on the lake Mamry Północne. In 5 species of birds (11% of all the examined) I found 2 species of trematodes belonging to two genera. They are parasites of rails, plovers, and sparrows.

33. *Leucochloridium cyanocittae* McIntosh, 1932

Geographical distribution: USA, USSR. In Poland Sulgostowska (1958).

Hosts: *Cyanocitta cristata bromia* (L.),*Actitis macularia* (L.), *Agelalius phoniceus* (L.), *Passerina cyanea* (L.), *Empidonax troillii* (Sch.), *Totanus flavipes* (Gm.), *Passer domesticus* (L.), *Serinus canaria* L., *Telmatotydes palustris*, *Sturnus vulgaris* L., *Fulica atra* L., *Charadrius dubius* Scop., *Vanellus vanellus* L., *Actitis hypoleucos* (L.), *Tringa ochropus* L., *T. glareola* (L.), *T. nebularia* (Gunn.), *T. stagnatilis* (Bechst.), *T. totanus* (L.), *Philomachus pugnax* (L.).

Habitat: large intestine.

Extensity of invasion: in 1 of the 4 examined *Philomachus pugnax* were 5 individuals, in 1 of the 7 examined *Lanius colurio* L. 1 individual, and in 1 of the 102 examined *Fulica atra* 23 individuals.

Note: In 1932 McIntosh reported from America 2 new species: *Leucochloridium actitis* (host — *Actitis macularia*) and *Leucochloridium cyanocittae* (*Cyanocitta cristata bromia*). In 1952 Kagan classifies the two species as one and includes the name *L. actitis* to the synonyms of *L. cyanocittae* on the basis of the priority of the description of the latter named. Simultaneously he reports new hosts mainly among sparrows. In USSR *L. cyanocittae* (accepted name *L. actitis*) is recorded mainly in plovers (Bychovskaja-Pavlovskaja and others). In Mazury occurs in plovers, sparrows and rails but is a rather rare parasite.

34. *Neoleucochloridium holostomum* (Rud., 1819)

Geographical distribution: Germany, Italy, Egypt, USSR.

Hosts: *Rallus aquaticus* L., *Gallinula chloropus* (L.), *Porzana porzana* (L.), *Fulica atra* (L.), *Crex crex* (L.), *Sterna hirundo* (L.), *Tringa glareola* L.

Habitat: large intestine.

In Poland recorded for the first time.

Extensity of invasion: in one examined *Rallus aquaticus* 35 individuals.

Fam. *Heterophyidae* Odhner, 1914

I found on the lakes Gołdapiwo and Mamry Północne only one species of this family.

35. *Apophallus mühlingi* (Jägerskiöld, 1899) Lühe, 1909

Geographical distribution: Europe and Asia. In Poland Ruszkowski (1925), Markowski (1933) and Sulgostowska (1958).

Hosts: *Felis catus dom.* L., *Canis familiaris* L., *Buteo buteo* (L.), *Pelecanus onocrotalus* L., *P. crispus* Bruch, *Phalacrocorax carbo* (L.), *Ph. pygmaeus* (Pall.), *Larus ridibundus* L., *L. argentatus cachinnans* Pall., *L. canus* L., *L. fuscus* L., *Sterna sandvicensis* (Lath.), *Colymbus stellatus* Pont., *Himantopus himantopus* (L.), *Ardea cinerea* L., *Egretta garzetta* (L.).

Habitat: intestine.

Extensity of invasion: on the lakes Gołdapiwo and Mamry Północne in 22.4% of *Larus ridibundus* (in 58 examined 13 invaded).

Intensity of invasion: in *Larus ridibundus* 10—400 individuals.

Note: in the biocoenosis of Mamry Północne belongs to common parasites, occurs very numerously by a medium extensity of invasion. On the lake Gołdapiwo, however, it is a rare parasite the prove of which is most likely the scanty number of final hosts (*Larus ridibundus*). In Mazury recorded many a time.

Fam. *Lecithodendriidae* Odhner, 1911

Are represented on the lake Mamry Północne only by one species.

36. *Laterotrema arenula* (Creplin, 1825)

Geographical distribution: Germany, USSR.

Host: *Fulica atra* L.

Habitat: duodenum and anterior part of small intestine.

In Poland recorded for the first time.

Extensity of invasion: on the lake Mamry Północne in 4% of *Fulica atra* (in 102 examined 4 invaded).

Intensity of invasion: 100—10000 specimens.

Note: it is difficult to liberate the trematodes from the intestinal content, because they are very small (the largest 0.7 mm) therefore the upper limit of intensity is not precisely determined. The separate individuals look like white granules of sand.

Results

On the basis of the collected material it was found that the fauna of trematodes on the lake Gołdapiwo is poorer than on the lake Mamry Północne. This is caused by: (a) a poorer in species fauna of birds on the lake Gołdapiwo (this is the result, most likely of the location of lake Gołdapiwo, which is situated more south in the country and occupies a smaller area), (b) numerically poorer fauna of birds, what hindered the examination of a sufficient number of hosts (an indispensable condition for the detection of rare species). However, the mezotropic character of the two lakes enabled me to elaborate their fauna of trematodes in one work.

On the basis of the collected data it can be supposed that:

1°. the composition of the parasitic fauna in a given biocoenosis depends above all on the occurrence in it of proper intermediate and final hosts;

2°. the composition of the parasitic fauna of a given species of bird (family of birds) depends on the taken food and so:

(a) if the birds take animal and plant food, the fauna is quantitatively and qualitatively rich;

(b) if the birds take animal food (mainly fishes), the fauna is quantitatively rich, but qualitatively poorer;

(c) if the birds take plant food, the fauna is quantitalively and qualitatively poor (*Fulica atra* is the exception because in it occur numerous species represented mainly by not numerous number of trematodes.

3°. the season of the year exerts also an influence on the composition of the parasitic fauna, because the quality of the taken food in the course of a year by birds changes depending on the season, what was broader elaborated by S u l g o s t o w s k a (1958).

4°. the species of trematodes have not the uniform specificity (Table III), they can be subdivided onto:

(a) species of a broad specificity but medium intensity, e.g. *Echinoparyphium recurvatum, Echinostoma revolutum, Schistogonimus rarus, Plagiorchis nanus, Prosthogonimus ovatus, Notocotylus attenuatus.*

(b) species of a narrow specificity but large intensity, e.g. *Monilifer spinulosus, Petasiger exaeretus, Laterotrema arenula.*

(c) species of a narrow specificity and small intensity in spite of a sufficient number of hosts, e.g. *Echinoparyphium clerci, Prosthogonimus cuneatus, Apopharynx bolodes.*

For the first time are recorded in Poland: *Echinoparyphium amphibolus, Echinoparyphium clerci, Echinostoma grandis, Episthmium mathevossianae, Hypoderaeum skrjabini, Moliniella anceps, Petasiger exaeretus, Petasiger neocomense, Schistogonimus rarus, Apopharynx bolodes, Psilotrema simillimum, Psilostomum spiculigerum, Neoleucochloridium holostomum, Laterotrema arenula.*

New hosts are reported for *Echinoparyphium recurvatum, Mesorchis pseudoechinatus, Moliniella anceps, Plagiorchis nanus, Prosthogonimus cuneatus, Schistogonimus rarus, Leucochloridium cyanocittae.*

New habitat is reported for *Echinostoma grandis, Moliniella anceps* and *Prosthogonimus ovatus.*

Author's address:
Zakład Zoologii S.G.G.W.
Warszawa, Rakowiecka 8

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STRESZCZENIE

W latach 1954—57 autorka zbadała na jeziorach Gołdapiwo i Mamry Północne 652 ptaki należące do 47 gatunków (11 rodzin): *Anatidae, Podicipedidae, Rallidae, Laridae, Ardeidae, Ciconiidae, Phalacrocoracidae, Accipitridae, Charadriidae, Alcedinidae, Passeriformes*. U 474 ptaków (72,7%) znalazła 36 gatunków przywr jelitowych należących do 7 rodzin: *Echinostomatidae, Plagiorchiidae, Psilostomatidae, Notocotylidae, Brachylaemidae, Heterophyidae, Lecithodendriidae*.

Spośród znalezionych gatunków 14 zanotowano w Polsce po raz pierwszy; są to: *Echinoparyphium amphibolus, Echinoparyphium clerci, Echinostoma grandis, Episthmium mathevossianae, Hypoderaeum skrjabini, Moliniella anceps, Petasiger exaeretus, Petasiger neocomense, Schistogonimus rarus, Apopharynx bolodes, Psilotrema simillimum, Psilostomum spiculigerum, Neoleucochloridium holostomum, Laterotrema arenula*.

Dla *Echinoparyphium recurvatum, Mesorchis pseudoechinatus, Moliniella anceps, Plagiorchis nanus, Prosthogonimus cuneatus, Schistogonimus rarus, Leucochloridium cyanocittae* zanotowano nowych żywicieli.

Dla *Echinostoma grandis, Moliniella anceps* i *Prosthogonimus ovatus* zanotowano nową lokalizację.